

COMPLIANCE EVALUATION REPORT
FOR THE RENEWAL OF CERTIFICATE OF COMPLIANCE GDP-2
REVISION 1
UNITED STATES ENRICHMENT CORPORATION
PORTSMOUTH GASEOUS DIFFUSION PLANT
PIKETON, OHIO
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1.0 INTRODUCTION

1.1 Introduction

This report documents the United States Nuclear Regulatory Commission (NRC) staff compliance evaluation report of the U.S. Enrichment Corporation (USEC) certification application for renewal of Certificate GDP-2 for the Portsmouth Gaseous Diffusion Plant (PORTS) located in Piketon, Ohio. The Portsmouth facility enriches natural uranium to a maximum of 10 percent uranium-235 (^{235}U) by the gaseous diffusion method. The April 15, 1998, application for renewal of Certificate GDP-2 does not contain any changes to the existing documentation; USEC incorporates by reference previous applications, statements, and reports into the renewal application. The application is based on USEC's initial application, as revised through Revision 19 dated April 15, 1998, and USEC's Compliance Plan, as revised through Revision 6, dated March 12, 1998. The renewal request is for a five-year period. The application consists of a safety analysis report (SAR), technical safety requirements (TSRs), emergency plan, a quality assurance program, environmental compliance status report, fundamental nuclear material control plan, transportation security plan, physical security plan, security plan for protection of classified matter, waste management program, decommissioning funding program, environmental information, and the compliance plan.

The application and all nonproprietary, unclassified supporting information and communications are available at the NRC Public Document Room (The Gelman Building, 2120 L Street, N.W., Washington, DC 20555) and at the Local Public Document Room (Portsmouth Public Library, 1220 Gallia Street, Portsmouth, Ohio 45662) under Docket 70-7002.

As part of the staff's consideration of the renewal application, there was a public comment period on the application. Notice appeared in the Federal Register (63FR24832) on May 5, 1998, providing a 45-day public comment period on the application. Comments dated June 19, 1998, and June 16, 1998, were received from the Federal Facilities Enforcement Office of the Environmental Protection Agency (EPA) and the United Plant Guard Workers Union of America (UPGWA), respectively, on the Portsmouth renewal application. These are addressed in Appendix A of this Compliance Evaluation Report (CER).

No major changes to programs or operations have occurred since the initial certification. The amendment on the SAR upgrade, which contains changes to the accident analysis and major changes to the TSRs, is still pending. The staff's review of this amendment is expected to be completed early next year. Therefore, the staff has conducted a limited review of those portions of the application for this renewal that did not include Chapters 2, 3, and 4 of the SAR and the facility-specific TSRs. In addition, the staff did not conduct a new, complete review of those programs that have not substantively changed since the initial certification.

1.2 Certification History

On September 16, 1996, the Director, Office of Nuclear Material Safety and Safeguards signed the Director's Decision on initial certification of the GDPs. Notice of this Decision appeared in the Federal Register (61FR49360) on September 19, 1996. The staff received several petitions requesting Commission review of the Decision. The Commission issued its Memorandum and Order (CLI-96-12) on November 22, 1996. The Commission denied the petitions, allowing the

certification to go forward. On November 26, 1996, NRC issued Certificate of Compliance GDP-2 for the PORTS. The NRC assumed regulatory jurisdiction for the PORTS on March 3, 1997.

In April 1997, USEC requested permission to submit its material balance and inventory reports according to a schedule different than that specified in 10 CFR 74.13(a)(1) and to report in accordance with Department of Energy (DOE) requirements instead of NRC requirements. 10 CFR Part 74.15(a) requires USEC to report special nuclear material (SNM) transactions on a computer-readable DOE/NRC Form 741 for inclusion in the Nuclear Materials Management and Safeguards System (NMMSS). In addition, 10 CFR Part 74.13(a)(1) requires USEC to report to NMMSS, on a computer-readable DOE/NRC Form 742, material balances concerning SNM received, produced, possessed, transferred, consumed, disposed of, or lost, on a six-month frequency. The current computerized reporting system, which is based on existing NRC guidance documents, does not address the semi-annual reporting needs for gaseous diffusion uranium enrichment facilities. Until the NRC guidance documents and the NMMSS reporting system are revised, USEC will not be able to completely comply with the requirements contained in 10 CFR Part 74.13(a)(1). Therefore, on April 30, 1997, NRC granted USEC an exemption from the reporting requirements in 74.13(a)(1). Instead, USEC is required to continue to make the transaction data reports on DOE/NRC Form 741. NMMSS will continue to periodically generate NMMSS Report M-742 using the information provided in USEC's DOE/NRC Form 741 submittals. The exemption also required USEC to reconcile facility records with NMMSS Report M-742 on a bimonthly basis, in accordance with DOE Order 5633.3B. In September 1997, USEC asked for a modification of two reporting requirements imposed by NRC's April 30, 1997, exemption letter. USEC requested that it be allowed to reconcile facility records with NMMSS-generated M-742 reports every six months as opposed to every two months, and to discontinue sending facility-generated inventory reports to the cognizant DOE field office after they have been reconciled with the M-742 report. The NRC staff concluded that since DOE discontinued its jurisdiction over USEC nuclear material in the leased and certified areas of PGDP on March 3, 1997, USEC should not be required to submit inventory reports to a DOE field office. In addition, the NRC staff concluded that reducing the frequency, for reconciling facility records with NMMSS-generated M-742 reports, from bimonthly to semiannually, would not reduce the effectiveness of the PGDP safeguards program and that this was consistent with the requirements of 10 CFR Part 74.13(a)(1). Therefore, on November 21, 1997, NRC exempted USEC from submitting reports of facility-generated inventory records reconciled with NMMSS-generated M-742 reports to the cognizant DOE field office and allowed USEC to reconcile facility-generated inventory records with NMMSS-generated M-742 reports for the semiannual periods ending on March 31 and September 30 of each year. An NRC-sponsored project is underway to revise the guidance to specify what data shall be reported by enrichment plants to NMMSS. This project is not complete, therefore, these exemptions remain in effect until NRC completes its revision of the guidance and USEC conforms to the guidance.

DOE had about 13 tons of highly enriched uranium (HEU) at Portsmouth in the form of UF_6 in 5-, 8- and 12-inch diameter cylinders. To downblend the HEU to low enriched uranium (LEU), the HEU was refeed into the cascade, to a location containing LEU, from nine feed stations, at a combined rate of between 1 and 80 kilogram (kg) U per day. Since this operation involved HEU, DOE maintained regulatory jurisdiction of the refeed stations and the HEU pipe leading to the cascade. Downblending was achieved almost instantaneously at the mixing point since

the

comparative LEU flow rate in the cascade was very high (roughly 12,000 kg U per day). Refeeding of HEU to the cascade was completed in July 1998. During the HEU refeed operations, DOE provided security for the entire X-326 cascade building. After USEC performed a security sweep of the leased and certified areas of X-326 to ensure that these areas would conform to the possession limits approved by NRC, on August 1, 1998, DOE reduced its security for the building. USEC completed its security sweep of the leased but uncertified areas of X-326--including the nine HEU refeed stations--and certified to the NRC on September 28, 1998, that these areas also meet the requirements of the certificate application and that converting these areas to NRC regulations would not cause USEC's NRC approved possession limits to be exceeded. By letter dated October 13, 1998, the NRC provided its concurrence regarding the transfer from DOE to NRC regulation--to become effective at 12:01 am on October 14, 1998--of the areas in X-326 that were used to refeed HEU to the cascade for downblending purposes. With this transfer of regulatory oversight, the only leased area at PORTS, which is not yet certified by the NRC, is the X-705 West Annex, where HEU cylinders, that were emptied during cascade HEU refeeding operations, are being cleaned. This cylinder cleaning operation is expected to be completed in early 2000.

During the HEU Suspension Project at PORTS, between 1992 and 1996, most of the X-326 cascade HEU inventory was removed. However, a fraction of the HEU inventory in the form of diffuse and inaccessible solid deposits still remains in both the larger portion of the X-326 cascade that is shut down and the portion that is still operating as part of LEU production. These HEU deposits in the X-326 installed equipment are from legacy DOE operations. An NRC letter dated July 29, 1998, requested USEC to; (1) demonstrate the inaccessibility of all uranium enriched to 10 or more weight percent (wt %) U-235 held up in installed equipment, (2) describe the process for controlling and maintaining the inaccessibility of such uranium and assuring that any removal of this material from installed equipment and the opening and closure of installed equipment containing such material would be conducted under DOE jurisdiction, (3) describe the applicable material control and accounting and reporting requirements applied to the transfer actions involving this material, (4) provide the quantities and ²³⁵U enrichment levels (assays) by location of this material, and (5) describe the controls relied upon to ensure the protection of this material. USEC responded to this request by letter dated August 13, 1998, which is currently being reviewed by the NRC staff. By letter dated August 24, 1998, DOE directed USEC to report to NMMSS as DOE-owned material, all uranium with ²³⁵U assays equal to or greater than 20 wt % in installed but shutdown equipment. By letter dated October 7, 1998, the NRC concurred with DOE's directions to USEC. DOE and USEC are currently in the process of finalizing an agreement which is anticipated to require USEC to also report to NMMSS any uranium having a ²³⁵U assay equal to or greater than 10 wt % but less than 20 wt %, in installed and shut down equipment, as DOE-owned material. USEC was not directed by DOE to report to NMMSS any HEU deposits located in operating equipment since the composition of these deposits is dynamic from being in constant contact with LEU of various enrichments which over time could cause the measured HEU deposit quantities for a certain ²³⁵U assay to change.

In February 1993, the Russian Federation and the United States signed a 20-year agreement to convert 500 tons of HEU from 20,000 Soviet nuclear warheads to 15,000 tons of LEU to be used as fuel in commercial reactors. USEC was identified as the Executive agent for the U.S. Government. In Russia, the warheads, in the form of HEU metal, are removed from the

missiles, processed in a series of chemical steps to produce UF₆ gas and downblended to LEU UF₆ with ²³⁵U assays typically between 4.4 and 4.95 wt %. Three separate Russian downblending facilities, located in Ekaterinburg, Krasnoyarsk and Tomsk, ship the LEU to PORTS in USEC-supplied 2.5-ton cylinders. The first shipment arrived at PORTS in June 1995. USEC expects to receive nearly one-third of the total 15,000 tons of LEU by the year 2001. The ²³⁵U assay of the incoming Russian LEU is confirmed at PORTS in accordance with the sampling and analysis plan described in USEC's Fundamental Nuclear Material Control (FNMC) plan for PORTS. The PORTS FNMC plan requires a liquid sample to be withdrawn for each cylinder in Russia, while being witnessed by USEC agents, or PORTS. The sample analysis is conducted PORTS.

The NRC has issued 14 amendments to Certificate of Compliance GDP-2 since the initial certification. There are currently 8 amendment requests pending. Certificate of Compliance GDP-2 expires on December 31, 1998. If the NRC has not taken final action on the renewal application before the expiration date, the plant may continue to operate under the timely renewal provisions of Part 76.

Privatization

The U. S. Enrichment Corporation Privatization Act directed USEC to implement a privatization plan. The Act also prohibits the issuance of a certificate of compliance by NRC to that entity if NRC determines that:

- The entity is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government; or
- Issuance of a certificate of compliance would be inimical to the common defense and security of the United States; or
- Issuance of a certificate of compliance would be inimical to the maintenance of a reliable and economical domestic source of enrichment services.

NRC prepared, in consultation with the Executive Branch agencies, a Standard Review Plan (SRP) to ensure consistency in, and to formally document, the process that was to be used by the staff to make the foreign ownership, control or domination, common defense and security, and reliable and economical source of domestic enrichment services determinations required by the statute. The SRP was used to make the findings to support privatization, and it will be used in the future when the staff must make the above findings to support recertification or other licensing actions.

By letter dated May 28, 1998, the Commission provided a Final Conditional Consent to Transfer the gaseous diffusion plant Certificates of Compliance to the privatized USEC following an Initial Public Offering (IPO) sale process. The NRC reviewed the privatized corporation's Foreign Ownership, Control, or Influence application, Standard and Poor's credit rating, and the USEC submission in response to NRC Information Notice 89-25, "Unauthorized Transfer of Ownership or Control of Licensed Activities." Based on the review of those documents, supplemented by interaction with the High Enriched Uranium Oversight Committee on common defense and

security requirements, the Commission determined that the proposed IPO privatization process and the resulting private corporation will meet all applicable NRC regulatory requirements, including those derived from the USEC Privatization Act regarding foreign ownership, control, and domination; common defense and security; and the maintenance of a reliable and economical source of domestic enrichment services. The Consent to Transfer was conditioned upon eight items which USEC has met. USEC, Inc. was formally privatized by the U.S. Treasury Department on July 28, 1998. USEC (the certificate holder) is a wholly-owned subsidiary of USEC, Inc.

As a condition of transfer, USEC consented to conditions related to foreign ownership, control and domination and the Russian High Enriched Uranium (HEU) Agreement. In order for these conditions to continue into the renewal period, the staff plans to include the following conditions in the Certificate.

If, at any time after the privatization date, the Corporation obtains information reasonably indicating changes described in the National Industrial Security Program Operating Manual, DOD 5520.22-M, January 1995 (NISPOM), Chapter 1, Section 3, 1-302(h), to the information previously submitted to NRC, described in the NISPOM, Chapter 2, Section 3, 2-302b.(1) through (11), the Corporation shall notify NRC in writing within 15 days.

If the Corporation enters into negotiations for the proposed merger, acquisition, or takeover by a foreign person, the Corporation shall submit notification to NRC, in writing, within 15 days of the commencement of such negotiations. The submission shall include the type of transaction under negotiation (stock purchase, asset purchase, etc.), the identity of the potential foreign person investor, a plan to negate foreign ownership, control, or domination, and copies of any related loan, purchase and shareholder agreements, annual reports, bylaws, articles of incorporation, partnership agreements, and reports filed with other federal agencies.

USEC, or its successors, as the Executive Agent for the United States for implementing the Russian HEU Agreement, shall notify NRC in writing within 15 days, of any termination or material change in the provisions of the "Memorandum of Agreement Between the United States Acting By and Through the United States Department of State, and the United States Department of Energy and the United States Enrichment Corporation, for USEC to Serve as the United States Government's Executive Agent Under the Agreement Between the United States and the Russian Federation Concerning the Disposition of Highly Enriched Uranium Extracted from Nuclear Weapons," entered into as of April 18, 1997.

The staff has not conducted a new determinations review for the renewal. The original determination was made during the timeframe the staff was working on the renewal. The staff is not aware of any information that would change the determination used to support the July privatization. The staff will make new findings at the time of the next recertification review (5 years).

1.3 Compliance History

The NRC has two resident inspectors located at the Portsmouth site. In addition, Region III and Headquarters staff conduct inspections of the activities at PORTS. From March 3, 1997, through September 30, 1998, NRC conducted 39 routine inspections and 2 special inspections of nuclear criticality safety, plant operations, plant maintenance and surveillance, plant support, engineering, training, fire safety, radiation safety, chemical process safety, transportation, security, and material control and accounting. The inspections resulted in 2 Severity Level III, and 63 Severity Level IV violations being assessed against USEC. Twenty non-cited violations were also documented in inspection reports.

Violations of NRC regulations are classified by four severity levels, with Severity Level I being assigned to violations that are most significant and Severity Level IV being assigned to violations that are least significant. There are other violations of minor safety, safeguards, or environmental significance that are below the level of significance of Severity Level IV violations. These violations are not usually subject to formal enforcement action and to the extent such violations are described in the inspection reports, they are noted as non-cited violations.

The first Severity Level III violation at Portsmouth was for multiple instances where USEC failed to implement nuclear criticality safety (NCS) controls for a uranium deposit that was in excess of the minimum critical mass, for having ineffective independent and self-assessment processes, and for ineffectively performing root cause evaluations and corrective actions. Even though there were no actual safety consequences associated with this violation, up to 14 shut-down cells of the PORTS cascade existed for an unknown period of time without the defined safety controls in place.

The second Severity Level III violation at Portsmouth involved USEC's failure to develop a testing program to demonstrate that autoclave air-to-close valves, which are important to safety, perform their intended safety functions upon loss of plant air (non-safety related system). While there were no actual safety consequences in this case, there was an increased potential for a significant chemical release if loss of plant air and a large UF_6 release inside an autoclave occurred simultaneously. This violation was also of particular concern, since, of the 55 safety isolation valves tested, 24 failed to perform their intended safety function over the full range of operating conditions.

The majority of the Severity Level IV violations at Portsmouth were in the areas of NCS, maintenance and surveillance, procedures (either implementing incorrect procedures or failing to follow procedures), and TSRs. Individually, none of these violations resulted in injuries or overexposures; however, the significant number of violations represent an adverse trend that if not corrected, could pose future safety significant problems. The NCS-specific violations involved inadequate characterization and untimely reporting of events, ineffective management oversight and ineffective and deficient NCS evaluations.

Recent inspection activity and plant internal investigations have revealed an inadequate closure of some of the NCS-related Compliance Plan items. Although a comprehensive NCS Corrective Action Plan (CAP) is in place to correct all known NCS program and implementation

deficiencies, progress has been slower than what was originally anticipated by USEC, partially due to the continued identification of additional deficiencies which have also been incorporated in the NCS CAP. However, trending of the identification of NCS deficiencies at PORTS since early 1998 indicates that the NCS CAP is having a significant positive impact on the implementation of the NCS program.

One Level IV violation involved an indoor accidental liquid UF_6 release due to hydraulic rupture of expansion bellows in an instrumentation cabinet in the depleted uranium withdrawal facility (Tails). The release occurred on May 8, 1998. USEC estimated the released UF_6 quantity to be 39 pounds. There were no overexposures. Urinalysis of the operator who initiated the "see and flee" event response action indicated an intake of 0.003 milligram (mg) uranium. This is well below the weekly 10 mg regulatory limit. No measurable radioactivity was released to the outside environment. The maximum level of removable alpha contamination was determined to be 21,000 disintegrations per minute per 100 square centimeter (dpm/100 cm²) inside the instrument cabinet where the release occurred; the site limit is 1,000 dpm/100 cm². The indoor contaminated areas have been cleaned to below the site limits, and the Tails has resumed operations.

1.4 Interagency Consultation

The Energy Policy Act of 1992 requires the NRC to consult with the EPA regarding certification. As part of that process, the NRC provided a copy of the April 15, 1998, USEC application for renewal to EPA. The staff also provided copies of the updated Environmental Compliance Status Report and Environmental Monitoring Report for the Portsmouth plant. EPA responded by letter dated June 19, 1998, and provided the NRC several comments addressing (1) the renewal time period, (2) incorporation of information in the renewal application by reference, (3) unavailability of environmental dose and effluent information, (4) potential impacts from groundwater contamination, (5) the Resource Conservation and Recovery Act (RCRA) compliance date, (6) compliance of underground storage tanks (USTs) with State requirements, and (7) discharge of polychlorinated biphenyls (PCBs) from electrical equipment. The EPA comments and responses to them are contained in Appendix A of this report. The staff also consulted with EPA and DOE during the preparation of the Annual Report to Congress.

In October 1997, NRC and DOE entered into a Memorandum of Understanding (MOU). The MOU delineates the responsibilities of NRC and DOE at the GDPs in areas such as exchange of information and technical staff support, emergency response, modification of the Compliance Plans, referral of identified concerns to the respective agency responsible for the particular concern, and other activities requiring coordination between NRC and DOE.

1.5 Possession Limits

The regulations in 10 CFR 76.35(a)(2) require USEC to provide the "name, amount, and specifications (including the chemical and physical form and, where applicable, isotopic content) of the special nuclear material, source and byproduct material the Corporation proposes to use, possess or produce, including any material held up in equipment from previous operations." The possession limits for NRC regulated source material, byproduct

material, and special nuclear material are listed in Table 1-3 of the SAR. The table specifies the maximum quantity of regulated material that may be possessed by PORTS at any given time.

PORTS can possess up to 300,000 metric tons of uranium as source material in the form of natural, depleted and waste material; 10 curies thorium as laboratory chemicals and instrument calibration and check sources; 300,000 metric tons of uranium enriched up to 10 wt % as special nuclear material including material held up in equipment, and instrument calibration and check sources; up to 10 kg uranium enriched greater than 10 wt % but less than 19.99 wt % that is held up in uninstalled equipment or used as calibration sources; up to 1 kg uranium with an enrichment equal to or greater than 20 wt % that is held up in uninstalled equipment or used in calibration sources; 50 curies (Ci) plutonium as sealed sources, 3 Ci plutonium as sealed glass ampules, and 0.5 Ci plutonium as unsealed sources (laboratory chemicals and samples); plutonium, technetium-99 and transuranics resulting from feed of recycled or enriched uranium; 2,000 Ci and 0.5 Ci of Cs-137 as sealed and unsealed sources, respectively; 450 Ci and 0.5 Ci of Co-60 as sealed and unsealed sources, respectively; up to 10 Ci each of Co-57 and Ni-63 as sealed sources; 10 Ci and 5 Ci of Tc-99 as sealed and unsealed sources, respectively; up to 0.5 Ci each of Sr-90 as sealed and unsealed sources; 0.5 Ci of Pr-147, 5.0 of Yb-169, 1.0 Ci of Ti-207 and 15 Ci of Ra-226 as sealed sources; 15 Ci and 0.5 Ci of americium as sealed and unsealed sources, respectively; 0.5 Ci and 1.0 Ci for transuranics other than plutonium, americium and californium as sealed and unsealed sources, respectively; 10 Ci and 0.5 Ci of californium as sealed and unsealed sources, respectively; and 1 Ci of other byproduct material as sealed and unsealed sources with no single isotope exceeding 100 millicuries (mCi). Based on the possession limits, PORTS is considered to be a Category III facility for safeguards and security purposes.

1.6 Plant Description

The regulations in 10 CFR 76.35(a)(1) require USEC to include in the SAR the “activities and locations involving special nuclear material and the general plan for carrying out these activities.” This information is provided in Chapters 1, 2, and 3 of the SAR.

PORTS is located on an approximately 3,708-acre federally-owned reservation in Pike County, Ohio. The site is in a generally rural area that was previously farmland and the watershed for several intermittent streams. The Scioto River Valley is 1 mile west of the facility. The Scioto River is a tributary of the Ohio River, and their confluence is approximately 20 miles south of PORTS. The largest cities within a 50-mile radius are Portsmouth, Ohio (from which the plant takes its name), located approximately 27 miles to the south and Chillicothe, Ohio, located approximately 27 miles to the north. Portions of 24 counties are located within a 50-mile radius of the plant, 18 of which are in Ohio, 5 in Kentucky, and 1 in West Virginia. Figure 1 shows the regional location of PORTS.

The principal process and purpose of PORTS is the production of enriched uranium for nuclear power reactors fuel. The uranium fuel cycle starts with the mining and milling of uranium ores to produce yellow cake followed by the conversion of the yellow cake to uranium hexafluoride (UF₆). The UF₆ is then shipped to an enrichment facility where the concentration of fissionable ²³⁵U is increased. The enriched UF₆ is transported to other fuel cycle facilities where it is processed and fabricated into fuel assemblies and then sent to nuclear power reactors. PORTS is a type of enrichment facility.

The gaseous diffusion separation process depends on the separation effect arising from

Figure 1 Regional Location of the Portsmouth Gaseous Diffusion Plant
Source SAR Figure 2.1-2

molecular effusion (i.e., the flow of gas through small orifices). When a mixture of gas molecules is confined in a vessel, the average velocity of the lighter molecules is greater than that of the heavier molecules. Therefore, the molecules of the lighter gas strike the vessel walls more frequently than the molecules of the heavier gas. If the walls of the container are porous with holes large enough to permit the escape of individual molecules, but sufficiently small so that bulk flow of the gas is prevented, then the lighter molecules escape more readily than the heavier ones. The gas consisting of the escaped molecules is then enriched with respect to the lighter component of the mixture.

The primary purpose of the enrichment facilities at PORTS is to produce uranium enriched in ^{235}U assay up to 10 wt % and to strip uranium partially depleted in ^{235}U content to an economically feasible assay. The PORTS enrichment facility consists of about 2400 operating stages. The cascade buildings are designated as X-333 (640 stages), X-330 (500 stages), and X-326 (2340 stages of which 1680 stages have been retired in place). The degree of isotopic separation in an efficiently operating diffuser cascade is only about 0.2 percent per stage. Consequently, about 1100 stages are required between the feed point and product withdrawal point to enrich uranium from normal feed at 0.71 wt % ^{235}U to product ranging at about 4.9 wt % ^{235}U . These stages are called the enrichers. An additional 620 stages are used to strip the ^{235}U isotope from normal feed to a tails withdrawal assay of 0.2 to 0.3 wt % ^{235}U . These stages are called the strippers. PORTS also receives uranium at a maximum assay of 2.75 wt % ^{235}U from the Paducah Gaseous Diffusion Plant (PGDP) located in Paducah, Kentucky. This Paducah product feed is fed into the cascade for further enrichment. The plant can produce 8.6 million separative work units (SWUs) annually at a rated power consumption of 2260 megawatts of electricity.

The basic unit of the gaseous diffusion process is the gaseous diffusion diffuser (or converter). Compressed UF_6 feed gas is made to flow inside a porous membrane or barrier tube. Approximately one-half of the gas passes through the barrier into a region of lower pressure. This gas is enriched in the component of lower molecular weight (^{235}U) and is sent to the next diffuser. The gas that does not pass through the barrier is depleted with respect to ^{235}U and is sent to the previous diffuser. Upon leaving the diffusion chamber, the enriched and depleted streams have to be recompressed to the barrier high-side pressure to make up for frictional losses. Because the degree of enrichment achieved in a single diffusion stage is very small, to achieve useful enrichment levels, the effect must be multiplied many times over by making use of a cascade of many stages in series. The exact number of stages required is determined by the enrichment needed.

The main components of a gaseous diffusion plant are: large cylindrical vessels called diffusers that contain the barrier, compressors used to compress the gas to the pressures needed for flow through the barrier tubes and from one stage to another, electric motors to drive the compressors, heat exchangers and cooling circuit for removing the heat of compression, piping for stage and interstage connections, control valves to adjust the gas flow, and block valves to isolate a group of stages comprising a cell. In addition to this process stage equipment, gaseous diffusion plants require auxiliary systems such as the UF_6 feed and withdrawal systems, an extensive electrical power distribution system, and cooling towers to dissipate the waste process heat. The following contains a brief description of the operations that occur in each of the main buildings. Figure 2 shows the plant layout.

Figure 2 Portsmouth Gaseous Diffusion Plant Layout
Source SAR Figure 2.1-4

X-333, X-330, and X-326: Process Buildings

The process equipment is housed in three process buildings: X-333, X-330, and X-326. The largest equipment is housed in X-333, where the majority of the power is consumed and the majority of the UF_6 is processed. The two floors in X-333 have a combined floor space of 65 acres. The upper floor in X-333 houses 640 stages (organized into 80 cells, 8 units) of X-33 (or 000) size equipment. The lower floor in X-333 houses an area control room (ACR), a local control center (LCC) for each cell and other auxiliary systems and equipment. Two smaller stage equipment sizes are operated in the X-330 Building, which contains both higher and lower ^{235}U assays than the X-333 Building. The upper floor houses 500 stages (50 cells, 5 units) of X-31 (or 00) size equipment and 600 stages (60 cells, 6 units) of X-29 (0) size equipment. The lower floor in X-330 houses two ACRs, an LCC for each cell and other auxiliary systems and equipment. The smallest process equipment is located in the X-326 Building. The upper floor in X-326 houses 720 stages of X-27 equipment, 1440 stages of X-25 equipment, and 180 stages of purge cascade equipment. Of the X-25 and X-27 equipment, 1680 stages have been retired in place; they were associated with former high enriched operations under DOE but are not used in the low enriched operations under the current NRC certificate. The lower floor in X-326 houses three ACRs, of which one is shut down, an LCC for each cell and other auxiliary systems and equipment.

The three process buildings also house the UF_6 withdrawal facilities where enriched and depleted UF_6 gas is condensed to a liquid and drained into 10-ton and 14-ton cylinders.

X-343, X-342, X-344: Feed, Sample and Transfer Facilities

Normal ^{235}U assay uranium hexafluoride feed and Paducah product feed (nominal 1.9 percent ^{235}U assay) are typically fed to the enrichment cascade from the X-343 Building (feed capability also exists in the X-342 Building). UF_6 can also be sampled in the X-343 Building. Operations involving UF_6 sampling and transfer from one cylinder into another are conducted in the X-344 Building. The UF_6 is heated with steam in autoclaves, converting the solid UF_6 in the cylinders to a liquid-vapor equilibrium. While feeding, UF_6 flows as a gas into the process equipment in the X-330 and X-333 Process Buildings through steam-traced, insulated headers. During sample and transfer operations, UF_6 flows as a liquid from the parent cylinder to the sample or daughter cylinder. The X-342 Building also contains the fluorine generation system for the plant.

X-300: Plant Control Facility

The process is controlled primarily in the three process buildings. The most important alarms, process data and control functions are received in the X-300 Plant Control Facility (PCF). Emergency process functions may be performed at the PCF. The personnel within the PCF provide the coordination of cascade operations and other key functions and the initial response to all plant emergencies. The building also contains the readouts to the plant's nuclear criticality alarm system (neutron detectors).

X-705: Decontamination and Uranium Recovery Facility

The X-705 Building contains a large decontamination spray facility and manual cleaning facilities for the decontamination of failed process equipment. Citric acid and nitric acid are the primary decontamination chemicals. A solvent extraction process and calciners are used to recover uranium from high concentration solutions and convert it to oxide. A microfiltration system is used to remove uranium from dilute wastes. The dilute solutions are pH adjusted to precipitate the uranium, and the very light sludge is processed through microfiltration columns to remove the uranium solids.

Other Buildings

The X-700 Building is used to conduct instrument calibration. The X-710 Laboratory contains a variety of laboratory chemicals and small amounts of process material. It is equipped with conventional laboratory hoods and conventional industrial spill control measures are maintained. Equipment maintenance is performed in the X-720 Building.

X-745-B through X-745-H: Cylinder Storage Yards

These areas are used for interim and long-term storage of USEC and DOE UF₆ cylinders.

1.7 Authorized Activities

The PORTS authorized activities for each regulated material are listed in Table 1-4 of the SAR. The authorized operations are discussed in more detail in Chapter 3 of the SAR. The activities conducted at PORTS are:

1. Enrichment of uranium up to 10 wt % ²³⁵U.
2. Receipt, storage, inspection, and acceptance sampling of cylinders containing uranium enriched up to 10 wt % ²³⁵U.
3. Nondestructive testing and analyses of product and process streams.
4. Filling, assay, storage, and shipment of cylinders of depleted uranium, natural uranium and containing up to 10 wt % ²³⁵U enriched uranium.
5. Cleaning and inspection of cylinders used for the storage and transport of process feed, product, and tails containing source or special nuclear material.
6. Storage of process wastes containing uranium, transuranic elements, and other contaminants and decay products.
7. Process, characterize, package, ship, or store low-level radioactive and mixed wastes.
8. Radiation protection, process control, and environmental sample collection, analysis, instrument calibration, and operation checks.

9. Maintenance, repair, and replacement of process equipment.
10. Laboratory analysis and testing.
11. Heating UF₆ cylinders and feeding contents into the diffusion process.
12. Calibration and use of portable radiation protection and fixed laboratory equipment.
13. Controlled feeding of UF₆ cylinders.
14. Transfer between cylinders.
15. Material remaining in equipment and facilities from previous operations.

USEC has included footnote e in Table 1-3 that would allow analysis of samples from offsite requesters and other DOE sites. NRC can only authorize those activities related to enrichment operations under the Certificate of Compliance. USEC would need a separate license to conduct analysis for offsite requesters, including other DOE sites. USEC can analyze samples from Portsmouth, Paducah, and Oak Ridge but not from other DOE sites. USEC can also analyze samples related to maintaining lab certifications. The staff plans to include the following condition to limit sample analysis to enrichment related samples:

Notwithstanding footnote e to Table 1-3 of the Safety Analysis Report, the United States Enrichment Corporation is not authorized to conduct analysis of samples for offsite requesters or for DOE sites unless it is related to uranium enrichment activities, including site remediation.

If USEC resolves the issue prior to the renewal, the staff will not include this condition in the Certificate of Compliance. The activities listed above are those which the NRC has reviewed and will continue to certify that they meet regulatory requirements. If additional activities are planned, USEC will need to perform a safety analysis and propose TSRs as necessary prior to conducting the activity.

1.8 Codes and Standards

Appendix A to Chapter 1 of the SAR contains a list of the various industry codes and standards and NRC regulatory guidance documents that have been referenced in the PORTS certification correspondence. The Appendix lists the extent to which PORTS satisfies each code, standard, and guidance document. In accordance with Compliance Plan Issue 45, USEC submitted a revision to Appendix A after reviewing the specific commitments to the various codes and standards. Although USEC has completed this Compliance Plan issue, the NRC has not completed its review and closed the issue. The staff plans to complete this review with the SAR upgrade (SARUP) amendment which is currently under review.

2.0 SITE CHARACTERISTICS

Update of the information in Chapter 2, "Site Characteristics," of the SAR is part of the SARUP and were not reviewed as part of the renewal effort. The new information will be reviewed as part of the SARUP effort.

3.0 ORGANIZATION AND ADMINISTRATION

The regulations in 10 CFR 76.35(a)(7) require that the SAR contain "a description of the management controls and oversight program to ensure that activities directly relevant to nuclear safety and safeguards and security are conducted in an appropriately controlled manner that ensures protection of employee and public health and safety and protection of the national security interests." Chapter 6 of the SAR describes the organization and management controls utilized by USEC to meet this requirement.

3.1 Organization

USEC is a wholly-owned subsidiary of USEC, Inc. Corporate offices are located in Bethesda, Maryland. USEC has hired a contractor, Lockheed Martin Utility Services, Inc. (LMUS), to operate the plant.¹ USEC retains responsibility for the safe operation of the facility. USEC approves the management structure and key positions; assignment of individuals to key positions; and qualifications, responsibilities and authorities for key positions.

USEC and LMUS have established an organization that has independent chains for the safety functions. The organization is discussed in Section 6.1 of the SAR. By TSR 3.3, USEC is required to use qualified individuals in facility positions, and to meet the responsibilities and qualification requirements described in the SAR for the key staff positions. TSR 3.2.1 requires USEC to establish and define the lines of authority, responsibility, and communication. The TSR also requires the safety functions to have organizational freedom to ensure independence from operations. Figure 3 shows the organization structure.

TSR 3.1.1 assigns corporate responsibility for overall GDP safety to the Executive Vice President, Operations. TSR 3.1.2 assigns responsibility for the overall safe plant operations to the General Manager. The Plant Shift Superintendent responsibilities are assigned by TSR 3.1.3. The Plant Shift Superintendent is responsible for the operational aspects of the plant and for the central control room command function. TSR 3.1.4 assigns the Division Managers responsibility for operations conducted within their facilities. These TSRs assigning responsibility are similar to the Westinghouse Standard Technical Specifications (WSTS). The staff concludes that the organization structure and assignment of responsibilities remain acceptable.

The regulations in 10 CFR 76.35(a)(3) state that the SAR must include: "The qualifications requirements, including training and experience, of the Corporation's management organization

¹On November 18, 1998, USEC announced that it will take over direct management and operation of the GDP's and that the transition is expected to be completed in 6 months.

and key individuals responsible for safety in accordance with the regulations in this chapter." Section 6.1.1 of the SAR describes the minimum qualifications needed for the key positions. It

Figure 3 Organization Structure
Source SAR Figure 6.1-1

is the responsibility of USEC to ensure that individuals in these positions meet the qualification requirements. TSR 3.3 requires facility positions to be filled by individuals whose experience/training qualify them for the position.

There have been no substantive changes to the minimum technical qualifications provided in the application since the initial certification. On this basis, the staff concludes that the minimum technical qualifications remain acceptable.

3.2 Safety Review Systems

The regulations in 10 CFR 76.68(a) require that plant changes must be approved by a safety review committee. USEC has established a safety committee to assist in the oversight function required by 10 CFR 76.35(a)(7) and to meet the requirement in 76.68(a). The safety committee, which is the Plant Operations Review Committee (PORC), is described in SAR Section 6.2 and in TSR 3.10. The PORC functions in an advisory role and supports the General Manager. USEC has also established an As Low As is Reasonably Achievable (ALARA) subcommittee and may from time to time establish other subcommittees to provide assistance in conducting the reviews and assessments required by the PORC.

The commitments for a safety committee have been reviewed, and the staff concludes that the commitments are adequate. There have been no substantive changes to the safety review systems since the initial certification. On this basis, the staff concludes that the safety review systems remain acceptable.

3.3 Operations

Operations is one of the topics required by 10 CFR 76.87(c) to be included in the TSRs. Operations is discussed in SAR Section 6.5. TSR 3.19 requires USEC to establish, implement, and maintain the operations program described in the SAR. The TSR requires the following program elements to be addressed: shift operations; cascade operations organization and administration; chemical/utilities/power organization and administration; operator responsibility, authority, and shift routines; operations procedures, operator aids, and system labeling; permits and logging; management monitoring of operations; and control of equipment.

The work force for the facility is divided into a day shift working primarily Monday-Friday and four rotating shifts which provide continuous coverage of plant operations. The gaseous diffusion process operates continuously. The day shift provides administrative support, activities such as design and fabrication, procedure development, classroom training, planning, and preventive maintenance. Most of the plant staff works on the day shift. The rotating shift organization has the prime responsibility for continued plant operation, exchange of information, and response to abnormal and unusual conditions to ensure safe operation of the facility. Typical activities include providing oversight and direction for all plant operations, monitoring systems and equipment for proper performance, conducting routine back shift maintenance and emergency equipment repair, preparing equipment for day shift repair/preventive maintenance functions, and responding to emergency situations. TSR 3.2.2 establishes appropriate minimum staffing levels for the plant. The average shift staffing on back shifts is approximately 116. TSR 3.2.2 also establishes overtime guidelines for staff who

perform safety functions.

TSR 3.23 addresses worker protection for UF₆ hazards. USEC is required to establish, implement, and maintain worker protection measures to minimize the risk and mitigate the consequences of releases of UF₆, UF₆ reaction products with moist air, and other associated process chemicals.

There have been no substantive changes to the operations program since the initial certification. On this basis, the staff concludes that the operations program remains acceptable.

3.4 Training

The regulations in 10 CFR 76.35(a)(5) require USEC to submit a "training program that meets the requirements of §76.95." According to 10 CFR 76.95, a training program must be "established, implemented, and maintained for individuals relied upon to operate, maintain, or modify the GDPs in a safe manner. The training program shall be based on a systems approach to training."

USEC describes its training program in Section 6.6 of the SAR. By TSR 3.4, USEC is required to establish, implement, and maintain the program as described in the SAR. The training program at PORTS consists of a number of elements, some of which utilize the systems approach to training and some that do not. Positions that are important to safety utilize the systems approach.

The PORTS training program addresses the necessary elements of a good program and meets the requirements of the regulations. The effectiveness of the program will be determined by how well it is implemented. There have been no substantive changes to the training program since the initial certification. On this basis, the staff concludes that the training program remains acceptable.

3.5 Procedures

Although a procedures program is not specifically required by the regulations, it is considered an essential part of the management controls and oversight program required by 10 CFR 76.35(a)(7) and by ASME NQA-1, "Quality Assurance Program Requirements for Nuclear Facilities." USEC is committed to the use of approved and controlled written procedures to conduct nuclear safety, safeguards, and security activities for the protection of the public, plant employees, and the environment. Procedures prescribe the essential actions or steps needed to safely and consistently perform safety related activities. The procedure program is described in Section 6.11 of the SAR. TSR 3.9 addresses the procedure program.

Section 6.11.4.1 and Appendix A to Section 6.11 of the SAR describes the minimum activities that shall be covered by written procedures. Topics covered are administrative procedures; system procedures that address startup, operation, and shutdown; abnormal operation/alarm response; maintenance procedures that address system repair, calibration, inspection, and testing; emergency response; and any task that is described in, or implements a commitment that is described in the SAR, TSRs, and plans submitted with the application.

In Appendix B to Section 6.11 of the SAR, USEC has listed the specific subsections of ANS 3.2-1994, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants," that will be utilized in the procedure program. Procedures are developed or modified through a formal process. Procedure development, control, and use is a process that consists of nine basic elements: identification, development, verification, review and comment resolution, approval, validation, issuance, change control, and periodic review. The PORC review is required for new procedures required by TSR 3.9 and for intent changes to those procedures. All procedures are periodically reviewed to ensure continued accuracy and usefulness. Emergency, Operating, and Alarm Response procedures and procedures dealing with highly hazardous chemicals are reviewed on a 1-year cycle. All procedures designated as In-Hand, those which involve liquid UF₆ handling activities, off-normal procedures, and Nuclear Material Control and Accountability procedures are reviewed on a 3-year cycle; all other procedures are on a 5-year review cycle.

TSR 3.9 requires that written procedures shall be prepared, reviewed, approved, implemented, and maintained. The TSR covers the review and approval of procedures and allows for temporary changes. The procedure program, as described in SAR Section 6.11 and the TSR is adequate. There have been no substantive changes to the procedures program since the initial certification. On this basis, the staff concludes that the procedures program remains acceptable.

3.6 Human Factors

Human factors is not specifically addressed in the regulations. However, USEC has proposed a human factors program in SAR Section 6.7. PORTS incorporates human factors considerations in engineering design work associated with new equipment and facility modifications; preparation, validation, and use of procedures; and in development of training and qualifications of personnel who operate, maintain, or modify structures, systems, and components relied upon for safety. Human factors is considered in problem reporting and investigation. Human actions required by the TSRs to prevent or mitigate accidents are systematically evaluated for human factor considerations on a 3-year cycle including accessibility, visibility, ergonomic capability, suitability of the environment for the required activity, and interferences. This program will result in human factors considerations for those actions important to safety. There have been no substantive changes to the human factors program since the initial certification. On this basis, the staff concludes that the human factors program remains acceptable.

3.7 Audits and Assessments

An audit and assessment program is not specifically required by the regulations but is considered part of the management controls and oversight program required by 10 CFR 76.35(a)(7) and the quality assurance program required by 10 CFR 76.35(d). PORTS has established a system of audits and assessments that is designed to ensure that the health, safety and environmental programs are adequate and effectively implemented. The Audit and Assessment Program is described in SAR Section 6.8. TSR 3.5 requires USEC to implement the program described in the Quality Assurance Program (QAP) and the SAR. The program is designed to ensure comprehensive program oversight at least once every 3 years.

There have been no substantive changes to the PORTS audit and assessment program since the initial certification. On this basis, the staff concludes that the audit and assessment program remains acceptable.

3.8 Quality Assurance

The regulations in 10 CFR 76.35(d) and 10 CFR 76.93 require USEC to submit a quality assurance (QA) program that satisfies "each of the applicable requirements of ASME NQA-1-1989" or "acceptable alternatives to the applicable requirements." The regulations require USEC to "execute the criteria in a graded approach to an extent that is commensurate with the importance to safety." USEC submitted the QAP with the application. The QAP establishes the minimum requirements for those items, activities, and services within the scope of the QAP. USEC has committed in the QAP to meet the Basic Requirements and Supplementary Requirements of ASME NQA-1-1989 or has committed to alternatives acceptable to the NRC.

USEC has established a graded QA program to categorize items and activities to which the applied level of quality would be in accordance with the relative importance to safety of the item and activity. Systems, structures, and components (SSCs) are categorized as Q, AQ, or NS by Engineering. The AQ category is further subdivided into an AQ-NCS category involving SSCs relied upon for nuclear criticality safety and a category for structures important to safety. The highest level of quality is applied to Q and AQ-NCS SSCs with a lesser level applied to other AQ SSCs. All other items and activities are identified as NS or non-safety. The current classification of SSCs is based on the existing accident analysis and engineering judgement based on GDP operating experience. The SARUP discussed in Section 4.0 of this CER will provide criteria for determining Q, AQ and NS SSCs.

The requirements of the main body of the QAP applies to the Q items and activities. Appendix A of the QAP defines the extent to which the QAP applies to AQ items and activities. Appendix A, Section 1 describes the QA program for AQ-NCS items and activities required to meet the double contingency principle. Appendix A, Section 2 describes the QA program for other AQ items and activities. Appendix A, Section 3 describes the QA program for AQ structures. The formal QA program is not applied to NS items. Section 3.8 of the SAR lists the systems and boundaries for the Q and AQ items, except for AQ-NCS items. Boundary definitions for AQ-NCS SSCs are documented in a manual for each facility. These manuals are maintained on-site and are not part of the application. In accordance with TSR 3.22, the system boundary documents shall identify utilities required by the SSC to perform its safety function.

There have been no substantive changes to the QAP since the initial certification. On this basis, the staff concludes that the QAP remains acceptable.

3.9 Event Reporting and Investigations

The regulations in 10 CFR 76.120 and other applicable sections referenced in 10 CFR 76.60 identify the reporting requirements for the GDPs. The PORTS Event Reporting and Investigation Program is described in Section 6.9 of the SAR. In addition to the requirements for oral notifications and written reports, USEC is required to determine root causes, adequate corrective actions, and lessons learned.

The staff questions two changes made to this program in Revision 19. The revision was submitted on April 15, 1998. The questions concern when an investigation will be conducted for an event and when corrective actions will be developed for an event. USEC revised the language to indicate that an investigation will be conducted and corrective actions developed to address the root cause(s) for each event where a written report is required to be provided to the NRC. The previous language required an investigation to be conducted for each reportable event and corrective actions to be developed for each event requiring NRC notification. Some events that are reported to the NRC do not require a written report, however, these events still warrant an investigation into the cause of the event. The staff is not approving these two changes that were part of Revision 19. USEC should take actions to address the staff's concern. To ensure that USEC resolves these issues in a timely manner, the staff plans to include the following condition:

The United States Enrichment Corporation shall conduct an investigation for each reportable event and develop corrective actions for each event or condition requiring NRC notification. USEC shall revise Sections 6.9.4 and 6.9.6 of the Portsmouth Safety Analysis Report to reflect these actions within 90 days of the renewal.

If USEC resolves the issue prior to the renewal, the staff will not include this condition in the Certificate of Compliance.² There have been no other substantive changes to the event reporting and investigations program since the initial certification. On this basis, the staff concludes that the rest of the event reporting and investigations program remains acceptable.

3.10 Record Management

A records management program is not specifically required by the regulations, however it is considered part of the management controls and oversight program required by 10 CFR 76.35(a)(7) and a necessary part of the QAP. The PORTS Records Management and Document Control (RMDC) Programs are described in Section 6.10 of the SAR. TSR 3.24 addresses the record retention program. There have been no substantive changes to the RMDC Program since the initial certification. On this basis, the staff concludes that the RMDC Program remains acceptable.

3.11 Maintenance

The regulations in 10 CFR 76.87 require the TSRs to address maintenance. The description of the PORTS Maintenance Program is contained in Section 6.4 of the SAR. By TSR 3.15, USEC is required to establish, implement, and maintain the program. The program addresses both corrective and preventive maintenance. The Maintenance Program is conducted in a graded approach commensurate with safety.

²The staff has determined that USEC's application revision 26, dated November 6, 1998, adequately modifies its Event Reporting and Investigation Program in SAR Section 6.9. As such, this proposed condition is not included in the Certificate of Compliance for the renewal.

There have been no substantive changes to the maintenance program since the initial certification. On this basis, the staff concludes that the maintenance program remains acceptable.

3.12 Configuration Management

The regulations in 10 CFR 76.68 require USEC to "maintain records of changes in the plant and of changes in the programs, plans, policies, procedures and operations described in the approved application, and copies of the safety analyses on which the changes were based." This is accomplished via the Configuration Management Program which is described in Section 6.3 of the SAR. The Configuration Management Program is used to control changes and maintain the plant configuration to ensure accurate, current design documentation that matches the plant's physical configuration while complying with applicable requirements.

There have been no substantive changes to the configuration management program since the initial certification. On this basis, the staff concludes that the configuration management program remains acceptable.

3.13 Management Controls

The regulations in 10 CFR 76.35(a)(7) require the SAR to contain a "description of the management controls and oversight program to ensure that activities directly relevant to nuclear safety and safeguards and security are conducted in an appropriately controlled manner that ensures protection of employee and public health and safety and protection of national security interests." USEC and LMUS have established management systems with associated policies, administrative procedures, and management controls to ensure protection of the health and safety of workers and the public, protection of the environment, and for the common defense and security. Management Systems and Programs are described in Chapters 5 and 6 of the SAR, the TSRs, and in the Program Plans.

Preceding sections of this CER mentioned many of the programs that come under the consideration of management controls. Primary among these are an organizational structure that has clear assignment of responsibilities and independent reporting chains for the safety functions, PORC, QA, a configuration management program, an audit and assessment program, and an investigation and reporting process. The PORC provides the necessary review for management to make informed decisions. The Audit and Assessment Program provides assurance that programs are being implemented in accordance with regulations and procedures. A QA Program is in place to promote safe, reliable, and efficient plant operation. PORTS investigates incidents to determine root cause and lessons learned. Items from the lessons learned are integrated into the procedures and training programs as appropriate. PORTS has a commitment tracking and corrective action management system that prioritizes plant actions consistent with their safety and safeguards significance. These items along with a procedures and training program, a maintenance program, the configuration management program, and other programs will provide the necessary tools for USEC to operate in a safe, reliable fashion. It is apparent from the staff inspection reports that operations at PORTS still experience some problems in the area of management controls especially in the area of nuclear criticality safety. These activities will continue to be closely followed by the NRC staff to ensure that the programs are being effectively implemented.

4.0 FACILITY AND PROCESS DESCRIPTION

The regulations in 10 CFR 76.35(a)(8) require USEC to provide a “description of the principal structures, systems, and components of the plant.” Chapter 3, “Facility and Process Description,” of the SAR provides the facility and process description. The staff is aware that the descriptions contained in Chapter 3 may not match the “as found” condition of the facility in all instances. USEC is in the process of reviewing, updating, and confirming the information contained in SAR Chapter 3. This effort will occur over the next year and is discussed further in the following paragraphs. The information contained in Chapter 3 of the SAR was not reviewed as part of the renewal effort.

SAR Upgrade

Compliance Plan Issue 2 addressed the SAR Upgrade. The SAR submitted as part of the initial certification application was based, in part, on the 1985 Final Safety Analysis Report (FSAR). The FSAR had a number of areas which needed to be updated with respect to the description of hazards, description of SSCs, human activities, and supporting safety analyses. DOE was still in the process of upgrading the FSAR at the time of initial certification. The upgrade was to provide comprehensive analysis of all credible initiating events and the consequences from these accidents to more clearly define the technical basis for safety boundaries. Compliance Plan Issue 2 captured this issue and required USEC to submit an amendment that addressed the SAR upgrade by August 17, 1997.

USEC submitted a portion of the SAR Update (SARUP) on August 18, 1997. On October 31, 1997, USEC submitted the remaining portions of the SARUP, with the exception of Chapter 3. The proposed accident analysis (Chapter 4) is completely revised with new and revised TSRs proposed that are based on the updated analysis. The staff review of the SARUP is ongoing.

Neither USEC’s nor DOE’s efforts in response to Compliance Plan Issue 2 included a systematic review, update, and confirmation of all the information contained in SAR Chapter 3. By its August 18, 1997, letter, USEC committed to performing a systematic review, update, and confirmation of the information contained in SAR Chapter 3 and to make necessary changes to the SARUP analyses and supporting documents by no later than October 31, 2000. Confirmation of the SARUP Chapter 3 information would involve field walkdowns and document reviews. By letter dated March 30, 1998, USEC provided the priority levels for the review and the schedule for the Chapter 3 revisions. By separate letter dated March 30, 1998, USEC requested an amendment to add a new condition to Certificate of Compliance GDP-2 to require USEC to review, update, and confirm the information in SAR Chapter 3. The amendment request would require USEC to submit the necessary changes to NRC by October 31, 1999, and make the necessary and related changes to the SARUP by October 31, 2000.

For updating SARUP Chapter 3, USEC has proposed six priority levels, with Level 1 being the highest priority and therefore the first worked and Level 6 being the lowest priority and therefore the last worked. Priority Level 1 would consist of Q SSCs with the focus on those systems with automatic actions or features that prevent, mitigate or contain a major release with significant off-site consequences. Level 2 would consist of Q, AQ-NCS, and AQ SSCs that have passive design features that mitigate off-site consequences, active features that

mitigate onsite or local

worker consequences, or alarm functions that provide for operator actions to mitigate accident conditions or reduce accident consequences. Priority Level 3 would consist of AQ-NCS and AQ SSCs that have lesser involvement in hazard or accident mitigation. Level 4 would consist of AQ-NCS and AQ SSCs that are secondary contributors to hazard or accident mitigation. Level 5 would include facility structures, on-site and off-site warning systems, and other AQ SSCs that have limited consequences associated with their failure. Level 6 would include AQ SSCs used for inventory, SSCs that provide event information, SSCs that are specific to on-site protective features, or currently inactive SSCs. Use of this prioritization will provide for those systems relied upon to prevent or mitigate postulated accidents that have the highest source terms and consequences to be completed first. The staff finds this prioritization acceptable.

Individual milestones for completion of the 6 levels are completion of Priority 1 SSCs by September 2, 1998, Priority 2 SSCs by December 3, 1998, Priority 3 SSCs by March 4, 1999, Priority 4 SSCs by May 6, 1999, Priority 5 SSCs by July 8, 1999, and Priority 6 SSCs by September 2, 1999. USEC has recently informed the NRC that the first milestone date has slipped, however, all changes will be submitted to the NRC by the completion date of October 31, 1999. The NRC expects USEC to inform it of those changes that significantly impact the accident assumptions and consequences and those that potentially affect the TSRs. As part of the amendment process, the staff will review the criteria to be proposed by USEC for determining when the NRC will be informed of significant changes. The staff's amendment review is ongoing.

5.0 ACCIDENT ANALYSIS

The regulations in 10 CFR 76.35(a)(4) require the SAR to include an "assessment of accidents based on the requirements of §76.85." A "reasonable spectrum of postulated accidents which include internal and external events and natural phenomena" is to be considered in the accident analyses. Chapter 4 of the SAR contains the PORTS accident analysis. By TSR 3.20, USEC is required to make changes to the accident analysis in accordance with the plant design change control process described in SAR Section 6.3. The TSR is acceptable. The SAR is based, in part, on the FSAR and approved safety evaluations performed by the plant during the intervening time period. At the time of the initial certification, the staff had reviewed and approved the accident analysis with the understanding that a site-wide safety analysis upgrade effort was ongoing. This effort was captured by Compliance Plan Issue 2. USEC has submitted the SARUP amendment that addresses the results of the upgrade effort. The staff is currently reviewing the SARUP amendment as a separate action, therefore, as part of the renewal process, the staff did not review Chapter 4, "Accident Analysis," again.

6.0 TECHNICAL SAFETY REQUIREMENTS

The regulations in 76.35(e) require the application to contain "Technical Safety Requirements in accordance with §76.87." The regulations further require a basis statement for the requirement to be part of the application, but not part of the TSR. The TSRs were to consider the information from the safety analysis report and contain appropriate references to established procedures and/or equipment to address the 14 topics listed in 76.87(c). The TSRs are to include safety limits, limiting control settings, limiting conditions for operation, design features, surveillances, and administrative controls as appropriate. The TSRs are

contained in volume 4

of the application. TSR 3.6 requires USEC to control the TSR Basis statements in accordance with the plant change control process described in Section 6.3 of the SAR.

The TSRs consist of facility-specific and equipment-specific TSRs and administrative TSRs. Section 1 contains TSRs related to use and application and includes definitions, time intervals for surveillances, intent of terms, and applicability statements. Section 2 contains the facility-specific TSRs, including TSRs on the autoclaves, UF₆ detection systems, criticality accident alarm systems, cylinder handling, cylinder filling, cylinder heating, fire protection system, and other process-related equipment. Section 3 contains the TSRs related to administrative controls, including responsibility assignment, the organization, staffing, PORC, procedures, training, criticality safety, and commitments to the radiation protection, fire protection, chemical safety, environmental protection, radioactive waste management, and maintenance programs, as well as the other topics required by the regulations.

Section 1 of the TSRs is the use and application section. Appropriate definitions are provided by TSR 1.2.1 through TSR 1.2.20. TSR 1.3 defines acceptable time intervals for surveillance (i.e., biennial surveillances could be conducted up to 2 years 6 months). Acronyms and intent of terms (shall, should, may) are covered by TSRs 1.4 and 1.5, respectively. Applicability statements for safety limits (1.6.1), operating limits (1.6.2), surveillance requirements (1.6.3), and conditions outside TSRs (1.6.4) are provided. The wording for these are similar to the WSTS and are acceptable.

Section 3 of the TSRs contains the administrative controls. TSR 3.17 commits USEC to the packaging and transportation quality assurance program that is described in the NRC-approved version of UEO-1041, "Radioactive Material Packaging and Transportation Quality Assurance Program." The staff approved the packaging and transportation quality assurance program by letter dated March 21, 1996. TSR 3.21 states that USEC is not dependent upon outside agencies to provide the level of safety described in the TSR and that USEC controls the facilities, structures, systems, and components that are relied upon in the TSRs. All of the other safety topics that 76.87(c) required to be addressed by the TSRs have been addressed by USEC and are discussed in other chapters of this CER.

The staff has reviewed a portion of the TSRs for the Portsmouth facility in conjunction with the renewal application; those TSRs in sections 1 and 3 were reevaluated for acceptability. The facility-specific TSRs contained in section 2 were not reevaluated. No changes were identified that invalidated the conclusions from the initial certification. The SAR upgrade project has resulted in USEC's identification of new safety systems and TSRs; it has also resulted in the elimination of current safety systems and a recommendation to eliminate some of the TSRs. USEC has submitted revised TSRs with the SARUP amendment; these revised TSRs will need to be evaluated based on the new information in the SARUP. This review is ongoing and is part of a separate action. The TSRs contained in the application continue to establish the necessary controls, provide the necessary program commitments for the facility.

USEC has been allowed to make changes to the TSR basis statements without prior staff approval, but has not been allowed to make changes to the TSR themselves without prior staff approval. The initial Certificate of Compliance contained a condition to impose the TSRs on USEC. In order to continue to impose the TSRs on USEC, the staff plans to include the following condition:

The United States Enrichment Corporation shall conduct its operations in accordance with the Technical Safety Requirements that are contained in Volume 4, Revision 21 of the Application. Changes to the Technical Safety Requirements shall require NRC approval prior to implementation.

7.0 RADIATION SAFETY

The regulations in 10 CFR 76.60(d) require USEC to comply with the applicable provisions of 10 CFR Part 20. In accordance with 10 CFR 20.1101, USEC is required to develop, document, and implement a radiation protection program commensurate with the scope and extent of activities to ensure compliance with the provisions contained in Part 20. The PORTS radiation protection program is described in SAR Section 5.3. TSR 3.13 requires USEC to establish, implement, and maintain the program described in the SAR. The TSR also requires the following elements to be addressed in the program: health physics technicians training and qualifications, personnel exposure control and measurement, contamination control, radioactive material control, radiological protection instruments and equipment, and records and reports. The PORTS radiation protection program involves the entire range of facility operations which could affect worker safety pertaining to radioactive material in normal operations or during accident conditions.

USEC continues to request an exemption from 10 CFR Part 20 requirements related to labeling containers. 10 CFR 20.1904 requires each container of radioactive material be labeled such that the radionuclide(s) including their estimated quantities, radiation levels, enrichment, and forms are identified. USEC states that it is impractical to label every container located in Radiation Areas. Instead, USEC has proposed to place one caution sign in the area stating that every container may contain radioactive material. In addition, USEC is committed to surveying all containers removed from contaminated or potentially contaminated areas to ensure that contamination is not spread around the plant site. As part of this exemption, USEC also wants relief from labeling UF₆ cylinders per 10 CFR 20.1904, since these cylinders are readily identifiable. Alternatively, USEC has proposed to have UF₆ cylinders constantly attended by qualified Radiological Workers during movement. The staff finds the on-site radiological safety impacts that could result from this exemption to the requirements of 10 CFR 20.1904 to be minimal and the alternatives proposed by USEC to be acceptable and therefore concludes that this exemption should be continued.

There have been no substantive changes to the radiation protection program since the initial certification. On this basis, the staff concludes that the radiation protection program remains acceptable.

8.0 NUCLEAR CRITICALITY SAFETY

The regulations in 10 CFR 76.87(c)(3) require the TSRs to address criticality prevention. In addition, 10 CFR 76.89 requires USEC to maintain and operate a criticality monitoring and audible alarm system. The nuclear criticality safety program is also part of the management controls and oversight necessary to protect the public health and safety required by 10 CFR 76.35(a)(7). The NCS program is described in Section 5.2 of the SAR and required by TSR 3.11.

TSR 3.11 establishes the foundation for the NCS program. USEC is required to establish, implement, and maintain the program as described in the SAR. The TSR further requires the NCS program to address the following elements: adherence with American National Standards Institute/American Nuclear Society (ANSI/ANS) standards, NCS responsibilities, process evaluation and approval, identification of SSCs to meet double contingency, design philosophy and review, criticality accident alarm system coverage, procedure requirements, posting and labeling requirements, change control, operation surveillance and assessment, and technical aspects. The TSR requires all operations involving uranium enriched to 1.0 wt % or higher and 15 gram (g) or more of ^{235}U to be based on a documented NCS evaluation and to be performed in accordance with an NCS approval. The TSR sets the minimum margin of subcriticality of 0.02 in k_{eff} and a k_{eff} of $\neq 0.9605$ (including the bias, uncertainty, and the margin of subcriticality) for all criticality calculations. The TSR further requires the double contingency principle to be used as the basis for design and operation of processes using fissionable materials; for those instances where double contingency is not met, TSRs shall be established, implemented, and maintained to prevent criticality from occurring. The staff concludes that this TSR sets an acceptable foundation for the NCS program. PORTS has committed to ANSI/ANS 8.1-1983, "Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors"; ANSI/ANS 8.7-1975, "Guide for Nuclear Criticality Safety in the Storage of Fissile Material"; and ANSI/ANS 8.19-1984, "Administrative Practices for Nuclear Criticality Safety."

Even though a comprehensive NCS CAP is currently in place at PORTS, there were no substantive changes made to the NCS program as described in Section 5.2 of the SAR since the initial certification. On this basis, the staff concludes that the NCS program, as described in the SAR, remains acceptable.

The regulations require a criticality monitoring and audible alarm system in all areas of the facility. The regulations (10 CFR 76.89(a)) also allow USEC to request approval to exclude areas from the monitoring requirement. By letter dated May 22, 1996, USEC submitted a request to exclude areas from the monitoring requirement. Areas covered by the request include facilities or portions of facilities that contain less than 15 grams ^{235}U , facilities or portions of facilities that contain uranium enriched to less than 1 wt % ^{235}U , roadways, and UF_6 cylinder storage yards. The staff is still reviewing the USEC exclusion request and plans to complete the review by the end of the year. In the interim, the staff acknowledges that the areas subject to the request do not have CAAS coverage. If the staff determines that CAAS coverage is required for any area covered by the exclusion request, the staff will work with USEC to establish a schedule for installation of a monitoring system.

9.0 ENVIRONMENTAL PROTECTION AND WASTE MANAGEMENT

The regulations in 10 CFR 76.60(d) requires that USEC comply with the applicable provisions of 10 CFR part 20. USEC describes its radiological environmental program in Section 5.1 of the SAR. By TSR 3.16, USEC is required to establish, implement, and maintain the program described in the SAR. The Radioactive Waste Management Program is required by TSR 3.14.

The environmental program includes a system of process and administrative controls to prevent releases above regulatory limits and to maintain effluents ALARA. TSR 3.8 requires USEC to control emissions as described in SAR Section 5.1.

The facility meets the dose limitations contained in the regulations. USEC has also established an acceptable environmental monitoring program that includes collection of ambient air, external gamma radiation, vegetation, soil, sediment, and water samples. There have been no substantive changes to the environmental protection program since the initial certification review. On this basis, the staff concludes that the environmental protection program remains acceptable.

The regulations in 10 CFR 76.35(g) requires USEC to submit a "compliance status report that includes the status of various State, local and Federal permits, licenses, approvals, and other entitlements, as described in §51.45(d) of this chapter. The report must include environmental and effluent monitoring data." As part of the annual update to the application, USEC submitted an updated Environmental Compliance Report. The Environmental Compliance Report contained information on the environmental permits issued to the facility, including the principal permit limits, a summary of monitoring and emissions/effluent data for each permit, and a summary statement on the status of USEC compliance. USEC also provided a summary of the data from the environmental monitoring program. The report met the requirements of the regulation and is therefore acceptable.

The regulations in 10 CFR 76.35(c) require the application to contain "any relevant information concerning deviations from the published Environmental Impact Statement, Environmental Assessments, or environmental permits under which the plants currently operate from which the Commission can prepare an environmental assessment related to the compliance plan." To meet this requirement, USEC submitted, as part of initial certification, a report called Supplemental Environmental Information. The information in this report and other information in the application was used in preparation of the staff's environmental assessment to support approval of the Compliance Plan associated with the initial certification. The report met the requirements of the regulation. In April 1998, USEC provided an update to the information to reflect that all of the Compliance Plan actions that could potentially cause adverse impact to the environment had been completed.

The regulations in 10 CFR 76.35(m) require "a description of the program, as appropriate, for processing, management, and disposal of mixed and radioactive wastes and depleted uranium generated by operations." To meet this requirement, USEC submitted two plans; the Radioactive Waste Management Plan and Depleted Uranium Management Plan.

There are several potential uses for depleted uranium that are being investigated by both USEC and DOE. However, for planning purposes, USEC is assuming that the ultimate disposition strategy for the remaining inventory will consist of converting the solid UF_6 to triuranium octoxide (U_3O_8) using the pyrohydrolysis process in which the UF_6 will be converted into a gas and combined with steam. The UF_6 gas will react with the steam to form uranyl fluoride (UO_2F_2) which is then converted to U_3O_8 in high temperature calciners. The U_3O_8 would then be packaged and shipped to an authorized repository. This approach is acceptable to the staff. In July 1998, USEC updated the depleted uranium tails quantity for which it is responsible. DOE is responsible for all tails generated prior to July 28, 1998.

The USEC Radioactive Waste Management Plan and the Depleted Uranium Management Plan adequately describe the programs for handling the wastes and depleted uranium generated by operations. There have been no substantive changes to these plans since the initial certification, other than the change to the quantity of depleted uranium tails for which USEC is responsible. On this basis, the staff concludes that the plans remain acceptable.

10.0 CHEMICAL SAFETY

The regulations in 10 CFR 76.87 require the TSRs to address chemical safety. Chemical safety includes the chemical hazards derived from radioactive materials and plant conditions related to the hazards of chemicals on or near the site that may directly or indirectly affect radiation risk. TSR 3.18 requires USEC to establish, implement, and maintain a chemical safety program as described in the SAR. Section 5.6 of the SAR describes the Chemical Safety Program at PORTS.

There have been no substantive changes to the chemical safety program since the initial certification. On this basis, the staff concludes that the chemical safety program remains acceptable.

11.0 FIRE PROTECTION

The regulations in 10 CFR 76.35(a)(6) require the SAR to include a "description of equipment and facilities which will be used by the Corporation to protect health and minimize danger to life or property" such as "fire protection systems." The PORTS fire protection program is described in Section 5.4 of the SAR. TSR 3.12 requires the establishment, implementation, and maintenance of the fire protection program.

On April 30, 1998, USEC submitted a request to amend their SARUP submittal by eliminating the fixed fire suppression sprinkler systems within X-342 and X-344 buildings and the sanitary and fire water system from the list of AQ systems. The basis for the amendment request is USEC's combustible loading analysis which indicates that an unmitigated fire in X-342 and X-344 would not (1) compromise the integrity of the UF₆ primary systems or a cylinder containing UF₆ and result in a release that would exceed the offsite exposure guidelines established in the SARUP or (2) threaten the structural steel or steel roof decking to cause collapse of X-342 and X-344. The staff will review this amendment request as part of the SARUP review which is expected to be completed in early 1999.

There have been no substantive changes to the fire protection program since the initial certification. On this basis, the staff concludes that the fire protection program remains acceptable.

12.0 EMERGENCY PREPAREDNESS

The regulations in 10 CFR 76.35(f) require USEC to submit an "emergency plan that meets the requirements of §76.91." §76.91 describes the type of information to be included in the Emergency Plan. USEC submitted an Emergency Plan for the PORTS with the application.

TSR 3.7 requires USEC to establish, implement, and maintain emergency response procedures to prescribe plant response to natural phenomena.

There have been no substantive changes to the Emergency Plan since the initial certification. On this basis, the staff concludes that the Emergency Plan remains acceptable.

13.0 SECURITY AND SAFEGUARDS

13.1 Material Control and Accounting

The regulations in 10 CFR 76, Subpart E requires USEC to meet specific requirements within Parts 70 and 74 for material control and accounting for Category I, Category II, and Category III SNM. The PORTS possession limits for special nuclear material of low strategic significance (SNM-LSS) are such that only safeguards requirements for Category III SNM-LSS apply to USEC activities at this plant. Specifically, USEC must comply with the applicable requirements of 10 CFR §§ 70.51, 74.11, 74.13, 74.15, 74.17, 74.33, 74.81, and 74.82.

The NRC recognizes that USEC may opt to engage in production or nonproduction activities that involve other than Category III material. In that event USEC must apply for and be certified by the NRC as meeting the applicable safeguards regulations in accordance with the category of material that it seeks to either possess and use or possess only.

USEC must implement an NRC-approved Fundamental Nuclear Material Control (FNMC) Plan pursuant to 10 CFR 74.33(b)(2), achieve the general performance objectives of 10 CFR 74.33(a), maintain the system capabilities required by 10 CFR 74.33(c), and establish records which comply with the record keeping requirements of 10 CFR 74.33(d)(1). Guidance for preparation of an FNMC Plan is provided in Regulatory Guide 5.67, "Material Control and Accounting for Uranium Enrichment Facilities Authorized to Produce SNM of Low Strategic Significance," and in NUREG/CR-5734, "Recommendations to the NRC on Acceptable Standard Format and Content for the FNMC Plan Required for Low-Enriched Uranium Enrichment Facilities."

As part of the application, USEC submitted the "Fundamental Nuclear Material Control Plan" for the Portsmouth facility; because of its nature, this plan is not publicly available. The plan describes how the PORTS facility will meet applicable NRC material control and accounting requirements. As part of the initial certification, the staff concluded that the FNMC Plan for the PORTS satisfied the performance objectives and system capabilities required by the regulations. There have been no substantive changes to the FNMC Plan since the initial certification. On this basis, the staff concludes that the FNMC Plan remains acceptable.

13.2 Physical Security and Transportation Protection

The regulations in 10 CFR Part 76, Subpart E requires USEC to meet specific requirements within Parts 70 and 73 for physical protection of Category I, Category II, and Category III SNM. Specifically, USEC must comply with the applicable requirements of 10 CFR 73.67, 73.71, and 73.74.

The NRC recognizes that USEC may opt to engage in production or nonproduction activities that involve other than Category III material. In that event, USEC must apply for and be certified by the NRC as meeting the applicable safeguard regulations in accordance with the category of material that it seeks to access, use, or possess.

USEC must meet the general performance objectives of 10 CFR 73.67(a); submit a physical security plan per 10 CFR §73.67(c); and comply with the measures for physical protection of SNM-LSS as required by §73.67(f) at plant sites and (g) for SNM-LSS intransit. Guidance for preparation of the physical protection plans and the transportation security plans by USEC is provided in Regulatory Guide 5.59, Revision 1, "Standard Format and Content for a Licensee Physical Security Plan for Protection of Special Nuclear Material of Moderate or Low Strategic Significance," February 1983.

As part of the application for the PORTS, USEC submitted the Physical Security Plan and the Transportation Security Plan; because of their nature, these plans are not publicly available. USEC has committed in the Physical Security Plan and the Transportation Security Plan for PORTS to implement procedures and measures to comply with the requirements of §73.67(f) and (g). USEC has addressed and commits to physical protection of export and import shipments of SNM-LSS in the Portsmouth Transportation Security Plan.

While HEU was being downblended in the cascade in X-326, the physical security measures that were required by DOE to be applied by USEC to the entire X-326 building were consistent with the DOE Category I requirements. These security requirements for X-326 were reduced by DOE after USEC completed HEU downblending in the cascade and performed a non destructive analysis (NDA) sweep of the NRC-certified areas of X-326 for DOE. This reduction also involved the termination of about half of the PORTS security force. USEC has described the current security requirements for X-326 in Addendum 4 to the Physical Protection Plan. USEC determined this addendum to not constitute a reduction in the effectiveness of the Physical Protection program for NRC-certified areas at PORTS. Addendum 4 was provided to the NRC by USEC in response to the NRC's request for additional information dated July 29, 1998, concerning HEU holdup in installed equipment. The NRC's request is summarized in Section 1.2 of this CER. USEC's response, including Addendum 4 of the Physical Protection Plan, as it applies to HEU hold-up in installed equipment, is currently being reviewed by the staff. Other than Addendum 4, as it applies to HEU hold-up in installed cascade equipment, there have been no substantive changes to the Physical Security Plan since the initial certification. There have been no substantive changes to the Transportation Security Plan since the initial certification. On this basis, the staff concludes that the Transportation Security Plan and the Physical Security Plan, as it applies to all NRC-certified areas without significant quantities of HEU in installed equipment, for the PORTS satisfy the performance objectives and system capabilities required by the regulations, meet the regulatory requirements for physical protection of SNM-LSS both at this site and during shipment to and from this site, and remain acceptable.

13.3 Classified Information

The regulations in 10 CFR Part 76.60(i) require USEC to comply with the requirements of 10 CFR Part 95, "Security Facility Approval and Safeguarding of National Security Information and

Restricted Data," in order to use, process, store, reproduce, transmit, transport, or handle National Security Information (NSI) and/or Restricted Data (RD) in connection with NRC-related activities. Additionally, in December 1993, the Chairman of the NRC and the Secretary of Energy signed a Joint Statement of Understanding that implemented the Energy Policy Act provisions on the regulation of gaseous diffusion uranium enrichment plants. Paragraph No. 4 of the Joint Statement of Understanding states that "During the entire period that the GDPs are in operation, and thereafter as long as necessary, DOE will be responsible for the administrative determinations relating to granting, suspending, adjudicating, or denying a security clearance, and for reinvestigating an individual's background for continued access." USEC must also comply with the guidelines set forth in the Joint Statement of Understanding between DOE and the NRC.

As part of the application, USEC submitted the "Security Plan for the Protection of Classified Matter" for the Portsmouth facility; because of its nature, this plan is not publicly available. USEC has made commitments which meet the requirements of 10 CFR Part 95 by providing an acceptable security plan that establishes controls to ensure that classified matter is used, stored, processed, reproduced, transmitted, transported, and destroyed only under conditions that will provide adequate protection and prevent access by unauthorized persons.

There have been no substantive changes to the security plan for the protection of classified matter since the initial certification. On this basis, the staff concludes that the security plan for the protection of classified matter for the PORTS continues to be acceptable in meeting the requirements of 10 CFR Part 95.

14.0 DECOMMISSIONING

The regulations in 10 CFR 76.35(n) require that USEC submit "a description of the funding program to be established to ensure that funds will be set aside and available for those aspects of the ultimate disposal of waste and depleted uranium, decontamination and decommissioning." The regulations further state that "the Corporation shall establish financial surety arrangements to ensure that sufficient funds will be available for the ultimate disposal of waste and depleted uranium, and decontamination and decommissioning activities which are the financial responsibility of the Corporation."

As part of the application USEC submitted a Decommissioning Funding Program Description. It addresses the scope of USEC's financial responsibility for decommissioning, a cost estimate and basis, and the funding mechanism.

Under the lease agreement with DOE and the Energy Policy Act, USEC is not responsible for the decontamination and decommissioning of the leased premises. DOE retains responsibility for the decommissioning, including decommissioning of any capital improvements (i.e., new buildings or equipment). USEC is financially responsible for the disposal of low-level radioactive waste and mixed waste generated by USEC and for the cost for disposition of the depleted uranium generated from the enrichment process. DOE retains liability for depleted uranium generated before USEC's privatization per the USEC Privatization Act.

The disposition of the depleted uranium tails is the major cost factor for decommissioning costs. The total unit cost for the disposition of depleted uranium is estimated to be approximately \$5.27 per kilogram of depleted uranium (\$4 per kilogram of uranium for conversion to U_3O_8 , \$1 per kilogram of U_3O_8 for disposal, and \$0.27 per kilogram for transportation.) When escalated for inflation through the end of fiscal year 1999, the average cost is \$5.75 per kilogram. The staff finds this estimate to be reasonable. A factor in USEC's future liability is the fact that DOE will be responsible for the ultimate disposition of the depleted uranium. Once DOE determines how it will disposition the tails, the staff will consider imposing that cost basis on USEC. USEC estimates that approximately 84,354 metric tons of depleted uranium will be generated by the Paducah and Portsmouth operations from October 1, 1997, through September 30, 2005. In accordance with the "Memorandum of Agreement Between the United States Department of Energy and the United States Enrichment Corporation Relating to Depleted Uranium," dated June 30, 1998, USEC will transfer depleted uranium to DOE in fiscal years 1999 through 2005. As such, USEC will only be responsible for the disposition of 56,100 metric tons of depleted uranium through June 30, 2005.

The estimated cost for the disposal of waste and for the disposition of depleted uranium at the PORTS for the first fiscal year of privatization is \$17.1 million. USEC has submitted an executed Payment Surety Bond and Standby Trust Agreement to establish the financial arrangements to ensure that sufficient funds will be available to cover the first year of operations of the privatized corporation. USEC has also committed to review the decommissioning cost estimates and associated funding levels in July of each year. USEC will adjust the estimated costs and funding level as necessary. The adjustments will take into account such factors as changes in volume and cost estimates, inflation, changes in plant condition, and changes in expected decontamination and decommissioning procedures. However, the proposed certificate renewal period will be for a 5-year period and not a 1-year period. Therefore, to ensure that the funding level is adjusted each year of the renewal period, the staff plans to include the following condition:

The United States Enrichment Corporation shall review the decommissioning cost estimates and associated funding levels in July of each year and adjust the estimates and funding levels as necessary. If USEC determines that the existing financial instruments do not adequately cover the adjusted decommissioning cost estimate, USEC shall submit financial instruments to cover the new cost estimates by September 30th of each year.

USEC may at their option submit financial instruments that ensure sufficient funding to cover the entire period covered by the certificate.

15.0 COMPLIANCE PLAN

As part of the initial certification, the NRC reviewed and approved the Compliance Plan, a plan for bringing areas into compliance where the plant is not fully in compliance with NRC regulations. It contains a description of the areas of noncompliance, a plan of actions and schedules (POAS) for achieving compliance, and a justification for continued operations (JCO) which addresses the adequacy of safety, safeguards, and security considerations. The Portsmouth plan contained 46 issues. USEC has identified all but six of the issues as

completed. USEC, however, is conducting additional reviews to confirm the completion of all items previously identified as being completed. The NRC will continue to inspect the closure of a sample number of Compliance Plan items during future inspections. The six issues currently identified as open are discussed below.

Issue 3, Autoclave Upgrades

This issue consists of ten separate items. Of these, two of the most safety significant items, which involve the capability to separately test the inner and outer containment valves and assuring the absence of backpressure in the steam lines and buffer air supply lines during the pressure decay testing of the autoclaves, have been completed. The incomplete items involve: (1) installation of fail-safe containment valves, (2) addition of a low air pressure switch to initiate containment upon loss of air, (3) means to assure that following actuation of the autoclave containment system the autoclave is not inadvertently opened if the internal pressure is above a certain value, (4) upgrading of the pressure transmitters, (5) installation of alarms for autoclave safety system actuations, (6) upgrading of the steam and condensate drain lines, (7) restoration of the autoclave head/shell sealing surfaces, and (8) provision for pressure relief devices for UF₆ cylinders per American Society of Mechanical Engineers (ASME) Code. The corresponding JCOs for the incomplete items include: (1) cycling twice or verifying operable prior to every heating cycle, and performing quarterly checks for closure and autoclave containment pressure decay or leak rate tests for those containment valves that do not fail safe, (2) maintaining the redundant instrumentation to initiate containment upon high-pressure indication with one pressure switch not depending on instrument air, (3) maintaining an alarm response procedure for the autoclaves to only allow them to be opened only after actuation of the containment system alarm is cleared, and an maintaining an interlock which does not allow the autoclave to be opened if the pressure is greater than 0.5 psig, (4) setting the trip setpoints with sufficient margin to compensate for known pressure transmitter inaccuracies, (5) ensuring that no operational alarms will activate the safety system, (6) draining the condensate during the first hour of heating, while most of the UF₆ remains solid in the cylinder, to an open drain instead of a steam trap, (7) using shims behind the O-ring gasket to compensate for irregularities in the autoclave head sealing surfaces, and (8) maintaining administrative procedures, positive controls on the source of heat and redundant steam cutoffs. As required by the POAS for Issue 3, PORTS completed performing these eight remaining upgrades on the first (Autoclave No. 6 in X-343) of thirteen operable autoclaves. The POAS for Issue 3 also requires USEC to complete the eight remaining autoclave upgrade items on the remaining twelve autoclaves by February 1, 2001. Currently, USEC is upgrading Autoclave Nos. 7 and 5 in X-343 and Autoclave No. 4 in X-344. According to USEC, the upgrade of Autoclave Nos. 7 and 5 in X-343 is due to be completed in early and mid 1999, respectively, and the upgrade of Autoclave No. 4 in X-344 is due to be completed in the fall of 1999. USEC has not informed the NRC of any potential delays regarding completion of this issue.

Issue 13, Posting of Radioactive Materials

This issue consists of three separate items. Of these, two have been completed by USEC. The completed items involve re-posting of building work areas to identify "Restricted Areas" and "Contamination Control Zones" and to caution workers that each unlabeled container in a restricted area may contain radioactive material. The incomplete item involves the re-posting

of all areas leased by USEC which is to be based on a systematic radiological characterization. USEC anticipates completing this action on schedule by December 31, 1998.

Issue 29, Records Management and Document Control Program

This issue consists of several related items most of which have been completed by USEC. Only three items remain open. The incomplete items involve the incorporation of records and documents required by USEC's Quality Assurance Program, and as committed to in the Certificate Application, into centralized records management and document control systems and the cataloging of all documents into an index for ease of retrieving. According to USEC, these actions are on schedule and are due to be completed by December 31, 1998.

Issue 30, Procedures Program

This issue consists of nine separate items. Only one item remains open. The incomplete item involves the review by the PORC or a PORC subcommittee of all procedures designated as In-Hand and which involve liquid UF₆ handling activities. The overall completion date for this issue is March 2, 2002 (five years after NRC assumed regulatory authority).

Proprietary Issues

A few items within two proprietary issues dealing with Issue A.2 entitled "Receipts Based on Measured Values" and Issue A.4 entitled "Possession of Uranium Enriched to Greater Than 10% ²³⁵U," are still open. According to USEC, Issue A.2 is anticipated to be completed on schedule by December 31, 1998. The last completion date for Issue A.4 is identified in the Compliance Plan as January 31, 1999. However, by letter dated October 14, 1998, USEC requested the NRC to authorize extending this completion date to April 30, 2000. The reason for the extension involves delays experienced by USEC in cleaning HEU cylinders, that were emptied during cascade HEU refuel operations, for DOE in the West Annex of X-705; an area which was not certified by the NRC. At the same time, USEC is also negotiating with NFS to have all or some of these cylinders cleaned at their facility located in Erwin, Tennessee. If an agreement is reached to have cylinders cleaned in NFS, then the Issue A.4 would likely be completed well before the proposed date of April 30, 2000. The staff anticipates completing its review of USEC's Compliance Plan Issue A.4 amendment request by the end of November 1998.

16.0 ENVIRONMENTAL REVIEW

Renewing the Certificate of Compliance for operation of the PORTS will not have a significant effect on the human environment. Continued regulation by the NRC will not result in any environmental impacts beyond those previously considered by DOE in its environmental reviews and which currently exist or would be expected to continue absent NRC regulatory oversight. Therefore, in accordance with 10 CFR 51.22(c)(19), neither an environmental assessment nor an environmental impact statement is warranted for the renewal of the certification of the PORTS. This determination only applies to those aspects that are in compliance with 10 CFR Part 76.

An Environmental Assessment (EA) was prepared as part of the Compliance Plan and application review process during the initial certification. The EA concluded that the

environmental effects of approving the Compliance Plan will be insignificant. The EA further concluded that the Compliance Plan is sufficient to ensure that, during the interim of noncompliance, plant operations related to areas of noncompliance will not significantly affect the quality of the human environment. The EA resulted in a Finding of No Significant Impact (FONSI). The FONSI was published in the Federal Register (61FR49360) on September 19, 1996. As there are no new Compliance Plan Issues, the staff did not prepare a new EA and FONSI. The staff considers the conclusions of the EA and FONSI to remain valid.

17.0 AUTHORIZATIONS AND EXEMPTIONS

As part of initial certification, USEC was authorized by the NRC, to release items for unrestricted use if the surface contamination is less than limits established in the SAR. USEC has requested continuation of this authorization for the renewal period. The limits are consistent with those established in the NRC's April 1993 document entitled "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear material." The staff continues to consider this authorization as being acceptable.

USEC has requested continuation of the exemption from 10 CFR 20.1904, "Labeling Containers," which requires that each container of certified material bears a durable, clearly visible label. The staff continues to consider this exemption as being acceptable. The basis for approving this exemption is contained in Chapter 7 of this CER.

To approve the special authorizations and exemptions, the staff recommends the following condition:

The United States Enrichment Corporation is hereby granted the special authorizations and exemptions in Chapter 1, Section 1.8 of the Safety Analysis Report, Revision 21.

18.0 TERM OF CERTIFICATE

The renewed certificate will be issued for an effective period of approximately 5 years, with an expiration date of December 31, 2003.

19.0 CONCLUSIONS

Upon completing the compliance evaluation of USEC's application, including the SAR, TSRs, program plans, and Compliance Plan, the staff concludes that there is reasonable assurance that the plant will continue to be operated such that public health and safety will be adequately protected, and that the common defense and security will not be endangered. Furthermore, the staff determined that the application fulfills the requirements of 10 CFR Part 76. The staff recommends that USEC be issued a renewed Certificate of Compliance in accordance with the statements and representations contained in the SAR, program plans, TSRs and Compliance Plan. The staff recommends that the following conditions be part of the certification (note that the first two conditions may be revised to reflect any amendments made between the submittal of Revision 21 and the date of recertification):

The United States Enrichment Corporation shall conduct its operations in accordance with the statements and representations contained in the Certification Application through Revision 21, and in the Compliance Plan through Revision 8.

The United States Enrichment Corporation shall conduct its operations in accordance with the Technical Safety Requirements that are contained in Volume 4, Revision 21 of the Application. Changes to the Technical Safety Requirements shall require NRC approval prior to implementation.

The United States Enrichment Corporation is hereby granted the special authorizations and exemptions in Chapter 1, Section 1.8 of the Safety Analysis Report, Revision 21.

If, at any time after the privatization date, the Corporation obtains information reasonably indicating changes described in the National Industrial Security Program Operating Manual, DOD 5520.22-M, January 1995 (NISPOM), Chapter 1, Section 3, 1-302(h), to the information previously submitted to NRC, described in the NISPOM, Chapter 2, Section 3, 2-302b.(1) through (11), the Corporation shall notify NRC in writing within 15 days.

If the Corporation enters into negotiations for the proposed merger, acquisition, or takeover by a foreign person, the Corporation shall submit notification to NRC, in writing, within 15 days of the commencement of such negotiations. The submission shall include the type of transaction under negotiation (stock purchase, asset purchase, etc.), the identity of the potential foreign person investor, a plan to negate foreign ownership, control, or domination, and copies of any related loan, purchase and shareholder agreements, annual reports, bylaws, articles of incorporation, partnership agreements, and reports filed with other federal agencies.

USEC, or its successors, as the Executive Agent for the United States for implementing the Russian HEU Agreement, shall notify NRC in writing within 15 days, of any termination or material change in the provisions of the "Memorandum of Agreement Between the United States Acting By and Through the United States Department of State, and the United States Department of Energy and the United States Enrichment Corporation, for USEC to Serve as the United States Government's Executive Agent Under the Agreement Between the United States and the Russian Federation Concerning the Disposition of Highly Enriched Uranium Extracted from Nuclear Weapons," entered into as of April 18, 1997.

Notwithstanding footnote e to Table 1-3 of the Safety Analysis Report, the United States Enrichment Corporation is not authorized to conduct analysis of samples for offsite requesters or for DOE sites unless it is related to uranium enrichment activities, including site remediation.

The United States Enrichment Corporation shall conduct an investigation for each reportable event and develop corrective actions for each event or

condition

requiring NRC notification. USEC shall revise Sections 6.9.4 and 6.9.6 of the Portsmouth Safety Analysis Report to reflect these actions within 90 days of the renewal.

The United States Enrichment Corporation shall review the decommissioning cost estimates and associated funding levels in July of each year and adjust the estimates and funding levels as necessary. If USEC determines that the existing financial instruments do not adequately cover the adjusted decommissioning cost estimate, USEC shall submit financial instruments to cover the new cost estimates by September 30th of each year.

20.0 ACRONYMS AND ABBREVIATIONS

ACR	Area Control Room
ALARA	as low as is reasonably achievable
ANSI/ANS	American National Standards Institute/American Nuclear Society
assay	²³⁵ U enrichment level
ASME	American Society of Mechanical Engineers
CAAS	criticality accident alarm system
CAP	corrective action program
CER	compliance evaluation report
Ci	curies
Co-57	cobalt-57
Co-60	cobalt-60
Cs-137	cesium-137
dpm/100 cm ²	disintegration per minute per 100 square centimeter
DOE	Department of Energy
EA	environmental assessment
EPA	Environmental Protection Agency
ERP	Extended Range Product (enriched uranium withdrawal facility)
FNMC	Fundamental Nuclear Material Control
FONSI	Finding of No Significant Impact
FSAR	1985 Final Safety Analysis Report
g	gram
GDP	gaseous diffusion plant
HEU	high enriched uranium
IPO	Initial Public Offering
JCO	justification for continued operation
kg	kilogram
LAW	Low Assay Withdrawal (enriched uranium withdrawal facility)
LCC	Local Control Center
LEU	low enriched uranium
LMUS	Lockheed Martin Utility Services, Inc.
mCi	millicurie
mg	milligram
NCS	nuclear criticality safety
NCSA	nuclear criticality safety approval
Ni-63	nickel-63
NMMSS	Nuclear Materials Management and Safeguards System
NSI	National Security Information
MOU	Memorandum of Understanding
NISPOM	National Industrial Security Program Operating Manual
NRC	United States Nuclear Regulatory Commission
PCB	polychlorinated biphenyl
PCF	Process Control Facility
PGDP	Paducah Gaseous Diffusion Plant
POAS	plan of action and schedule
PORC	plant operations review committee
PORTS	Portsmouth Gaseous Diffusion Plant

Pr-147	protactinium-147
QA	quality assurance
QAP	Quality Assurance Program
Ra-226	radium-226
RCRA	Resource Conservation and Recovery Act
RD	restricted data
RMDC	Records Management and Document Control
SAR	Safety Analysis Report
SARUP	Safety Analysis Report Upgrade
SNM	special nuclear material
SNM-LSS	special nuclear material of low strategic significance
SRP	standard review plan
SSC	structure, system, and component
Sr-90	strontium-90
SWU	separative work unit
Tails	depleted uranium withdrawal facility
Tc-99	technitium-99
Tl-207	thallium-207
TSR	technical safety requirement
²³⁵ U	uranium-235
UF ₆	uranium hexafluoride
U ₃ O ₈	triuranium octoxide
UO ₂ F ₂	uranyl fluoride
UPGWA	United Plant Guard Workers of America
USEC	United States Enrichment Corporation
UST	underground storage tank
wt %	weight percent
WSTS	Westinghouse Standard Technical Specifications
Yb-169	ytterbium-169

APPENDIX A PUBLIC COMMENTS AND NRC STAFF RESPONSES

As part of the consultation process with EPA, EPA did provide comments on the renewal applications for Paducah and Portsmouth. For Paducah, EPA found the environmental section of the application to be factually accurate and complete and that there were no current enforcement actions being taken at the plant. For Portsmouth, EPA had some specific comments. The first three comments addressed below are generic to Portsmouth and Paducah and the next three are specific to Portsmouth.

Comment: "The renewal period should be every 2 years, instead of 5 years. The determination should relate to and be based upon, among other factors, the degree of environmental compliance of the facility."

Response: The operations at the GDPs remain reasonably stable, with few changes. Because of the stable operations, frequent review is not necessary. Other fuel cycle facilities are licensed for 10-year periods. NRC has resident inspectors (2) at each GDP. The NRC also conducts routine and special inspections from both the Region III office and from Headquarters to evaluate activities at the site. The NRC currently reviews the compliance status of the GDPs in the Annual Report to Congress. The staff believes that a 5-year period for the certification is reasonable.

Comment: "The significant amount of information "incorporated by reference" makes a thorough review of the Renewal Application difficult."

Response: The staff agrees that incorporating by reference can make the review more difficult, particularly for those who are not familiar with the application documents. A renewal application that has no changes from the current application is easier to review than a complete new submittal. A new submittal requires more effort because it may not be clear where changes have been made. Incorporation by reference is permitted by the regulations and is encouraged, particularly when there are few changes in operation as is the case for the GDPs.

Comment: "The statement "Due to the required schedule for submission of this document, effluent and environmental data and public dose assessments for CY 1997 will not be available in time for inclusion here," is too general and insufficient. Additional justification/explanation which details for the reader the reasons why data up to FY97 can not be available should be provided."

Response: Due to the time lag in obtaining sample analysis data, it is not unusual for the data to be a year behind. The NRC typically reviews the data on a calendar year basis versus a fiscal year basis. The NRC also has access to the most current data through the inspection program. As part of the annual update filed every April 15, USEC provides updated environmental data.

Comment: "Clean Water Act: While there is passing mention of TCE being present in onsite groundwater plumes in this section, there is no mention of a groundwater monitoring program on page 5 under Section 4, Environmental Monitoring Data, and the monitoring data summary tables do not include groundwater monitoring. Are there offsite public or private water supply wells that have or could be impacted by the facilities[sic] groundwater contamination plumes? If so, what steps is the facility taking to monitor and remediate offsite contamination?"

Response: Groundwater monitoring and remediation remains the responsibility of DOE and therefore the details of these programs are not required to be included in the application to the NRC.

Comment: "Resource Conservation and Recovery Act (RCRA): According to RCRIS, USEC returned to compliance on July 15, 1997, with the one violation cited. The date of compliance should be mentioned in the document."

Response: The NRC staff agrees with the comment if the violation was issued to USEC; in which case the staff will ask USEC to include the date of compliance. However, if the referenced violation was issued to DOE, then the date need not be mentioned. The NRC staff has asked USEC to provide the information needed to respond to this comment.

Comment: "Underground Storage Tanks (UST): Portsmouth has 11 USTs. The application indicates that they are in compliance with applicable State requirements. EPA Region V will pass this info to Ohio-EPA."

Response: No response is necessary.

Comment: "Polychlorinated Biphenyl: USEC and DOE have overlapping environmental responsibilities at this site. DOE's main responsibility includes storage, disposal, spills, and waste prior to the inception of USEC in July of 1993 (referred to as "legacy waste"). After July, 1993, uncontrolled discharges of PCBs from electrical equipment operated by USEC, together with other TSCA regulations, are the responsibility of USEC. A recent Notice of Non-compliance issued to USEC, we understand, has initiated dialogue between USEC and DOE to detail environmental responsibilities between the two parties located at this facility."

Response: The NRC was informed by USEC that, prior to being privatized, the EPA had issued Portsmouth a variance from the regulations until USEC's privatization which occurred on July 28, 1998. On October 14, 1998, the EPA extended this variance.

Comments were also received on the Portsmouth application for renewal from the United Plant Guard Workers of America (UPGWA) union Local 66 by letter dated June 16, 1998. Along with the comments, the UPGWA also forwarded several problem reports dealing with discovery of HEU in X-326 as a result of USEC's security sweep and uranium hold-up measurements conducted for the purposes of downgrading the security requirements from a DOE Category I level to an NRC Category III level. The UPGWA also included a copy of USEC's slides

presented at an NRC pre-decisional enforcement conference held on June 5, 1998. One of the apparent violations addressed in this enforcement conference dealt with the exceedance of possession limit issue raised in the UPGWA comments.

Comment: NRC's pre-decisional enforcement conference of June 5, 1998, included an apparent violation which involved discovery of HEU in a USEC-leased and NRC-certified area of Building X-326 which caused USEC to exceed their possession limits of highly enriched uranium (HEU). This apparent violation, which likely would not result in the issuance of an actual violation, was placed in the Open Line (a Portsmouth Gaseous Diffusion Plant circular for all employees). This is very serious in that USEC felt comfortable in placing the apparent violation in the Open Line. Also, if the HEU was found in the building, after DOE downgraded its security requirements from Category I to Category III levels for the building, then there would be no second chance if the material fell into the wrong hands.

Response: On April 12, 1998, while performing a security sweep in Building X-326, USEC discovered six items containing about 775 grams of highly enriched uranium with U-235 enrichments of greater than 80 percent. This caused USEC to exceed their 1 kg possession limit for all USEC-leased and NRC-certified areas by 339 grams. However, since this violation was non-repetitive, and was identified and corrected by USEC, the NRC treated it as a Non-Cited Violation in accordance with the NRC's Enforcement Policy. In addition, at the time this material was found, because of the ongoing HEU refeed program, the security measures being applied to the entire building X-326, were equivalent to that for a DOE Category I facility. Therefore, the possibility of this material falling into the wrong hands was equally remote as that for other HEU in X-326. Now that DOE has downgraded the security of X-326, the possibility of finding accessible HEU in USEC-leased and NRC-certified areas in X-326 appears to be highly remote since USEC has completed a thorough security sweep of the building and in the process moved all HEU found during the sweep to appropriately protected (caged) areas within X-326. It should be noted that making all PORTS employees aware of an apparent violation by placing it in the Open Line is an internal USEC decision.